THE STATUS OF THE MUSKELLUNGE PROGRAM

An Informational Report to the Natural Resources Board

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INTRODUCTION

Currently, an estimated 219,000 anglers, 13% of all anglers, fish for muskellunge. They make an average of about 7 trips/year and harvest 1 musky for every 21 trips. The current annual harvest is estimated to be about 69,000 legal-sized fish. This is about 40% of the estimated state population of 174,000 legal muskies, and is 4% higher than it should be if fishing quality is to be maintained. Muskellunge angling pressure is expected to continue to increase and the number of legal fish available to decrease, primarily due to habitat losses. With existing trends, 249,000 anglers will harvest 78,300 muskies in 1990, or 46% of the 168,400 fish projected to be available. It is felt that this level of "overharvest" will result in an accelerated reduction in both legal-size and trophy-size fish as well as a significant reduction in natural reproduction. Figure 1 provides estimated harvest and harvestable population trends through 1990.

Basic to the management program is the fact that muskellunge provide a trophy fishery. To maintain the quality of this important resource, it will be necessary to (1) increase the reliability of our information on angling pressure, harvest and exploitation, (2) increase the effectiveness of the primary management program, stocking, and (3) increase angling opportunities.

NEEDS

A. Increase the reliability of our information on angling pressure, harvest and exploitation.

Discussion:

The current and projected status of muskellunge populations in relation to angling pressure, harvest and exploitation is of major importance in refining management direction and determining success. The insufficiency of accurate data in these areas limits the effectiveness of the management program. Angling pressure data are based upon a series of general fishing questionnaires sent to the public between 1964 and 1975. More in-depth and current information is needed. The estimates of numbers of muskellunge available and the allowable exploitation rate was determined by using data from a few lakes. Although the data are reliable, information from more waters is needed to better estimate statewide supply/demand.

The relationship of the current supply of fish available to that needed to fulfill angler demand indicates the basic overall need and therefore the general direction and emphasis of management.

Approaches:

1. Require registration of all muskellunge harvested. Many registration systems have been proposed but no ideal one has been found. The best proposal made to date is a punch system on the angling license. This could be used in conjunction with a season bag limit. Persons harvesting a fish would punch a hole at a specified location on the license and note the date, length of the fish, and water in which it was caught. That portion of the license would be turned in to the license depot when a new license was purchased for the following year. This system could request information on the total number of trips made, successful and unsuccessful, and other items of interest. It would not give information on the harvest by unlicensed anglers, however. The degree of compliance in returning license stubs has not been estimated, but even with shortcomings, the system would give more reliable information on angling effort than is currently available.

2. Conduct creel census and voluntary registration systems on representative waters. The Bureau of Research is evaluating these methods on a few waters. Creel census efforts tend to miss successful anglers; because of the one fish daily bag limit, successful anglers usually leave the lake immediately after catching a fish. These individuals are therefore less apt to be interviewed than the unsuccessful anglers. Voluntary registration systems are normally incomplete, and harvest lists for a lake may include false information, especially fish harvested from other waters. Although information from a number of waters is available from creel census and voluntary registration programs, more is needed and it must be coordinated to give a statewide picture.

3. Conduct population studies on representative waters. Fish managers and researchers have gathered information on population size and structure in a number of waters. Because of the low density of this species, it is difficult to obtain enough data to give reliable results; many studies that are initiated do not yield the desired information. Population studies are most valuable when done in waters where the harvest is known because there, exploitation rates can be determined accurately.

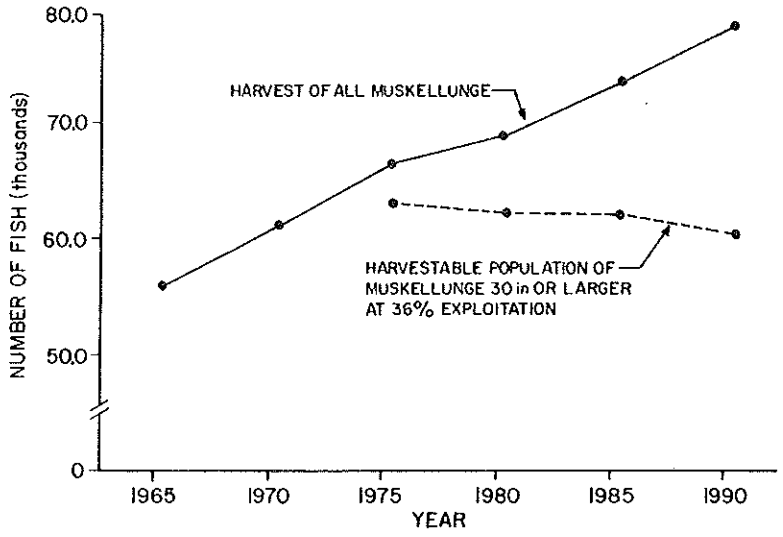

Figure 1. Population and harvest trends for muskellunge.

Suggested strategies:

1. After a positive reaction is obtained from the Conservation Congress and other interested groups, initiate a compulsory harvest registration system.

2. Conduct creel census and voluntary harvest registration systems on representative waters.

3. Estimate population size and structure in representative waters, especially those where the harvest is known.

B. Increase the effectiveness of stocking.

Discussion:

Annually 1,000,000 fry and 140,000 fingerlings are stocked in about 100 waters. In addition 20,000 hybrid muskellunge fingerlings are planted in waters of southern Wisconsin. Although stocking results vary a great deal, it is estimated that 10-20% of the large fingerlings stocked are creeled as legal fish. Except under rare circumstances, stocking small fingerlings has resulted in very poor, if any, survival. Hybrid stocking has produced satisfactory results in larger lakes, but is generally unsatisfactory in the smaller, heavily fished waters. In many cases, numerous small fish are caught but few legal-size fish are taken.

Continuation of existing production levels is in jeopardy because of inflation and inadequate budgets. This dictates added emphasis upon maximizing stocking survival and propagating fish that will be most cost effective. The latest cost figures (1977-78) indicate true muskellunge fingerlings cost $2.21 each or $11.96/lb while hybrid fingerlings cost $1.38 each or $7.61/lb. True muskellunge cost considerably more because they are fed minnows, whereas hybrids are fed dried pellets, much like trout. This, of course, is much cheaper than harvesting or purchasing live forage.

Approaches:

1. Improve stocking procedures and criteria. Stocking results have been evaluated in a number of waters and considerable research has been done in an attempt to identify factors that limit survival. The need for abundant cover, ample forage fish and minimal predation has been documented. There are undoubtedly other important factors that have not yet been identified. When these are known, the Department will be able to develop a classification system to guide the muskellunge stocking program.

   Currently, some waters are stocked annually but many others are stocked every other year or even less frequently. Some managers believe that less frequent stocking and stocking rates lower than the 2/acre now used will maximize results. Those alternatives have not been adequately evaluated.

2. Reduce production costs so current stocking levels can be maintained in spite of inflation and inadequate budgets. The main reason for high costs of muskellunge fingerlings is the cost of the minnows they are fed. About 5 lb of minnows are needed for each pound of fingerlings raised. Preliminary estimates indicate that those taken in Department forage operations cost about the same as those purchased from dealers, $.78 to $1.00/lb. If large dependable quantities of forage were available close to the fingerling production ponds, costs would be reduced. But, if methods can be developed to rear true muskellunge on pellets like hybrids, much greater savings will result. Although hybrids are reared very successfully on pellets, efforts to develop satisfactory methods for the true muskellunge have been largely unsuccessful. This year, however, about 4,200 small fingerlings were reared.

   The development of greater minnow production by using sewage treatment ponds and intensive rearing techniques holds promise. Although few sewage treatment ponds are suitable, those that are can produce large quantities of minnows. In most cases, long hauling distances are involved causing considerable cost.

   The technology of intensive minnow culture has been developed but has not been tried adequately here. The economics of this operation must be investigated, however, because of the need for specialized facilities and large quantities of feed or fertilizer.

Suggested Strategies:

1. Continue evaluating stocking to identify factors limiting survival and counteract them where possible.

2. Determine optimum stocking rates and frequencies by testing in different types of waters.

3. Continue the development of suitable methods to rear true muskellunge on pelleted feed.

4. Continue to develop and evaluate cost effective alternatives in providing live forage for musky rearing.

C. Increase angling opportunities.

Discussion:

Muskellunge angling opportunities are presently somewhat less than actual demand. This shortage is expected to become more acute in the future. Angling opportunities are based upon the amount of water containing muskellunge and the number of harvestable fish available. Increasing either of these will insure the opportunity for muskellunge anglers.

Approach:

1. Introduce muskellunge into additional waters. Historically there has been a gradual but slow expansion of the muskellunge range through stocking. Most initial introductions have been made in waters immediately adjacent to those already containing muskellunge. In recent years a few of the southern lakes have been managed for hybrids. Some of these are being switched to true muskellunge in order to produce better results for the angler. Although muskellunge have been introduced in waters far removed from the original range, there has been a reluctance to expand significantly for three reasons: (1) current stocking levels elsewhere would have to be reduced or propagation efforts increased, (2) muskellunge might replace other valuable predators instead of increasing predator numbers, and (3) the historic recreation industry of the north might be affected if good muskellunge angling were available elsewhere.

   After weighing these concerns and the energy shortage, it is apparent that muskellunge should probably be introduced into a limited number of additional waters near population centers. The management of a few additional large waters would increase muskellunge angling opportunities markedly. It is also very probable that these waters may produce some exceptionally large fish, due to higher fertility, abundant forage and a longer growing season.

2. Restrict harvest. A reduction of the harvest would theoretically make more fish available for anglers to catch even if they could not keep them. Elimination of an effective angling method would likewise increase the number of fish that could be caught by a different method.

   The elimination of motor trolling on muskellunge waters has been hotly contested. Many objections are based on use conflicts, not on overharvest. There is no evidence positive or negative, that motor trolling affects musky populations. Most waters having no motor trolling have no better muskellunge populations than those where motor trolling is allowed. There may be individual waters where motor trolling has become a problem, however. Some anglers believe motor trolling is much more effective for catching muskellunge than other methods and, therefore, this method can easily cause overharvest. Although information on the subject is fragmentary, this does not appear to be true. Undoubtedly, individual anglers have become very proficient at trolling, but others have probably become equally proficient using other methods. Objections to motor trolling because of use conflicts and differences in the interpretation of sportsmanship are largely sociological. Public attitudes must play a major part in angling regulations. Public opinion is of utmost value in this matter.

   Trolling is currently allowed on 1/3 of the 404,700 acres containing muskellunge. Only six of these waters are class A; about 1/2 of the remainder are class B. Table 1 shows the number of lakes and the amount of water affected by eliminating motor trolling from muskellunge lakes smaller than certain acreages. These are grouped by size category and muskellunge classification. If motor trolling is to be reduced on muskellunge waters, it could best be accomplished by eliminating it in the lakes smaller than 1,000 acres. There are 90 lakes covering 31,591 acres in this category.

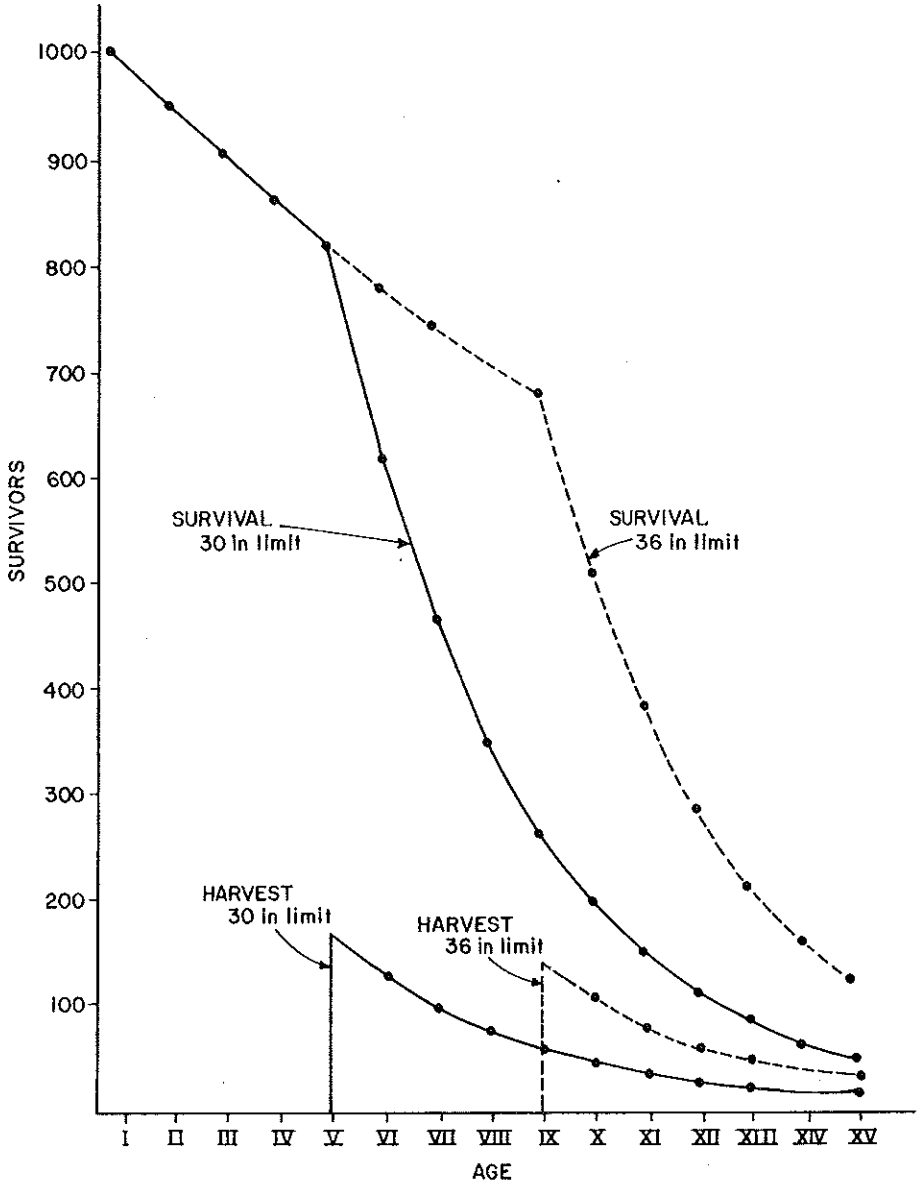

Figure 2. Theoretical survival and harvest with 30- and 36-in length limits.

Changes in motor trolling regulations will affect anglers fishing for other species as well as muskellunge anglers. Most of these waters contain walleyes. Undoubtedly more people troll for walleyes than for muskellunge in these lakes. Prohibiting motor trolling may therefore affect more walleye anglers than those that fish muskellunge. If trolling were eliminated from all lakes containing muskellunge, it would drastically affect walleye fishing on lakes such as Winnebago, Butte des Morts, Mendota and Wissota.

The establishment of a higher size limit has been discussed at length. Minimum length limits regulate musky harvest much more than any other restriction, and increasing the length limit from the historic 30-in minimum would probably be the most effective method of reducing the harvest. The total effect of larger length limits is unknown, but tests will soon be initiated. Undoubtedly a larger length limit would cause an immediate drastic reduction in harvest. After the initial decrease, the harvest would gradually increase, but how much is not known. The amount of increase of larger fish would depend upon natural mortality. It is very possible that if the fish are not harvested until they become larger, natural mortality rates may increase and a significant portion of the expected benefits would be negated. An increased natural mortality among male fish is almost certain because their growth rates are slower than those of females and they usually don't live as long. The uncertainty about the results of higher length limits is compounded by the possibility of significant mortality among those fish that are caught and released.

Some anglers and fish managers object to high length limits on muskellunge on this basis. They point out that any muskellunge larger than 30 in is strong enough to prevent most anglers from removing the hooks and releasing the fish before it is permanently damaged. The larger the length limit imposed, the more acute this problem becomes.

Historically, most length limits have been set at a size which would allow the fish to spawn at least once. Recently, research on a number of northern Wisconsin lakes indicates that although some female muskellunge spawn when they are only 4 years old and perhaps 25 in long, all females cannot be expected to mature until they are 6 or 7 years old and 32 to 34 in. In some lakes, they must be even larger. Variation in maturity depends upon age and growth. Therefore considerable differences occur. It appears that a 34-in limit would probably protect females in most waters until they spawn once. Additional spawning may increase natural reproduction and therefore native muskellunge populations, but it appears that in most waters, numbers of mature females are more than adequate.

Research on Lac Court Oreilles indicates an annual mortality of 4.7% from age I to V, the age at which they reach legal size. After that, annual mortality jumps to 25%, presumably due to angling mortality. If 1,000 yearlings experienced these mortality rates, anglers would catch about 630 fish weighing about 6,900 lb with a 30-in limit, but would catch about 450 fish weighing 8,000 lb with a 36-in limit. Figure 2 shows these comparisons graphically. Field trials to test these theoretical rates are essential before regulation changes are considered seriously.

Season bag limits may be another effective method of reducing harvest. Many believe that relatively few anglers harvest large numbers of fish but others believe that most very successful musky anglers return all but a few large trophies each year. Establishment of a season bag would be effective only with adequate enforcement. This could probably be accomplished with minimal expense by initiating a punch system on the angling license as previously described; however, this would not cover unlicensed anglers. Special muskellunge licenses for these individuals might be required.

Suggested Strategies

1. Introduce and manage muskellunge in a limited number of additional waters, preferably large waters near population centers.

2. Eliminate motor trolling only on individual waters where specific problems exist.

3. Evaluate a larger (32-36 in) minimum length limit on a number of waters.

4. After a positive reaction is obtained from the Conservation Congress and other interested groups, initiate a season bag limit.

SUMMARY

Wisconsin continues to lead the nation in muskellunge management. Yearly more than 200,000 anglers harvest about 70,000 legal muskies from 861 lakes and streams.

The objectives of our program emphasize high quality trophy fishing. Wisconsin must continually evaluate and update the program if we are to enhance the quality and quantity of trophy musky fishing in the face of increased fishing pressure during the next decade.

Although further advances in propagation are possible, the major opportunities for improved trophy angling rest with managing harvest rates and population structure through sound rules based on scientific management principles.

This report addresses a number of potential regulations that must be evaluated to assess their usefulness toward achieving more and higher quality trophy fishing in the 1980's and 1990's.

We believe that by bringing future needs to the public and Natural Resources Board through reports such as this, we will be able to obtain both the understanding and support needed to implement the management programs required.

TABLE 1. MUSKY LAKES OPEN FOR MOTOR TROLLING - 1980

(Excluding Mississippi River Pools, Lake Winnebago & the Great Lakes)

	LAKES Under 200 Acres		LAKES Under 300 Acres		LAKES Under 400 Acres		LAKES Under 500 Acres		LAKES Under 1000 Acres		TOTAL LAKES All Sizes	
	NO.	ACRES	NO.	ACRES	NO.	ACRES	NO.	ACRES	NO.	ACRES	NO.	ACRES
Class A Musky Lakes	1	85	1	85	2	431	3	854	5	2,173	6	3,954
with Walleye	-	-	-	-	1	346	2	769	3	1,291	3	1,291
Class B Musky Lakes	11	1,444	17	2,974	20	4,042	21	4,480	40	17,851	59	74,437
with Walleye	7	850	12	2,150	15	3,218	16	3,656	33	15,825	52	72,411
Class C Musky Lakes	25	1,842	32	3,675	35	4,699	35	4,699	45	11,567	61	79,645
with Walleye	19	1,442	26	3,275	29	4,299	29	4,299	39	11,167	55	79,245
All Musky Lakes	37	3,371	50	6,734	57	9,172	59	10,033	90	31,591	126	158,036
with Walleye	26	2,292	38	5,425	45	7,863	47	8,724	75	28,283	110	152,947
If all musky waters in this size range are closed for trolling, trolling will still be allowed:												
On musky lakes	89	154,665	76	151,202	69	148,864	67	148,003	36	126,445	0	0
On walleye lakes	389	354,288	377	351,155	370	348,717	368	347,856	340	328,297	305	203,633

All walleye lakes open to trolling: 415 = 356,580 acres.

Dist.: Fish Bur.; Fish Mgrs.; Fish Res. Biol.
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